

Sloshing Gas in the Core of the Most Luminous Galaxy Cluster RXJ1347.5-1145

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ABSTRACT

We present new constraints on the merger history of the most X-ray luminous cluster of galaxies, RXJ1347.5-1145, based its unique multiwavelength morphology. Our X-ray analysis confirms the core gas is undergoing “sloshing” resulting from a prior, large scale, gravitational perturbation. In combination with extensive multiwavelength observations, the sloshing gas points to the primary and secondary clusters having had at least two prior strong gravitational interactions. The evidence supports a model in which the secondary subcluster with mass $M=4.8\pm2.4\times10^{14} M_{\odot}$ has previously ($\gtrsim0.6$ Gyr ago) passed by the primary cluster, and has now returned for a subsequent crossing where the subcluster’s gas has been completely stripped from its dark matter halo. RXJ1347 is a prime example of how core gas sloshing may be used to constrain the merger histories of galaxy clusters through multiwavelength analyses.